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ABSTRACT

The authors describe a project designed to facilitate rapid transmission of scientific and technical information through expanded use of television and video-tape recording. The basic system utilizes remotely operated video-tape cameras to record and review conferences and lectures. Since the participants are undisturbed by cameramen and equipment, the recordings appear more natural and less staged. The system provides a method for immediate feedback as well as a rapid and economical method for editing. Once the conference or lecture is recorded, the tapes are duplicated for playback on video playback monitors or for release on closed circuit television. Consequently, the system reduces the time required to prepare materials for distribution to interested audiences. (Author/LG)

VIDEO RECORDING BRIDGES THE "PROCEEDINGS GAP"

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1 VIDEO RECORDING BRIDGES THE "PROCEEDINGS GAP"

At any time during the past 25 years it would have been possible to give a meaningful report on "the communications revolution". For actually there has been a revolution brewing since the end of World War II. A revolution both in technology and in the teaching and use of communication skills. No longer do we have distinct, little disciplinary packages called "speech", "rhetoric", "journalism", and "technical writing". For many of us today there is something in each of these packages. Nor does the term "mass communications" imply the former magic of vast publishing empires and television networks. Communication is becoming a more personal thing. There are so many more choices--so many new channels--open to each of us.

I don't mean to imply that the days of mass television are over--only that today's communication pattern is like the opening up of cable TV. Where once there were three or four channels available in the past, there now can be dozens. In print, the swing is to specialized journals--even specialized popular magazines. And the Xerox machine is turning every would-be author into his own publisher. We've come a long, long way to get back to personal publication--the kind that took place in the Colonies before newspapers became popular!

But in reporting scientific and technical information, the new technologies have not had enough impact. We have our specialized journals, of course. More than ever before--a virtual "paper blizzard". But communication continues to be along time-honored disciplinary channels, even though many of us recognize that today's problems need an interdisciplinary approach, not just a multi-disciplinary approach. And there are delays, aggravating delays. It's often months before a scientist gets around to writing up the results of his research. Then the processes of peer review and refereeing require more months. And the article still must wait for publication in its appropriate journal where the people who see it may

 not be the ones who would benefit most from the research in the first place.

In reporting meetings the situation is even worse. Papers that don't make the headlines are buried until the "Proceedings" come out. And by that time they're so old that the "Proceedings" are of value only for the record. (The Spanish Academy of Sciences is said to hold the time-delay record, an interval of 50 years between a meeting and the publication of its "Proceedings".)

So here we have a communications revolution and a communications problem. Why not let the revolution help solve the problem?

The OECD (Organization for Economic Cooperation and Development) recently published a report on Information for a Changing Society. As summarized in Science magazine, this report concluded that, "Full effectiveness of information for public policy demands a proper mixture of scientific and technological information--in a system specifically designed for the purpose, rather than the discipline-oriented information systems designed by specialists for other specialists". The report said that existing disciplinary information systems are not being used adequately in making facts available for developing public policy, applying technology, and developing science. It recommended new, experimental approaches to the communication of information to meet the needs of researchers, engineers, administrators, and public policy makers.

One such approach is the expanded use of television and videotape recording as a primary communication mechanism. Because television is a personal medium, there are possibilities here for verbal and non-verbal communication that are not even approached by the printed media. For instance, the Canadian National Film Board is using television to get people to talk to each other in an attempt to solve mutual problems. The people are

3 trained to use Sony "porta-pack" equipment. The people make their own tapes, and the Film Board provides editing and technical advice. The results are individual taped dramas--"sociodramas" if you will, developed for showing to community groups. The communication is within each group itself, and the group members decide whether or not to release the tapes for wider showing. The tapes are not suitable for showing on regular television channels, but they're technically OK for cable television. In Vancouver, where community tapes are being shown on one of the largest cable systems in North America, they've become very popular.

The possibilities for such use of television are enormous. With the cable and a few thousand dollars worth of equipment, any community group can get into television production. It doesn't require a big studio or a major facility investment.

But if the potentialities are to be realized, there must be some kind of a bridge between the equipment and the people who will use it. Despite the advertising, the equipment remains intricate and sometimes unreliable. "Video virgins" must face the prospect of losing much time and money before they can get into production.

To meet this need, we are developing a model community and cable television facility at Battelle--a place where we can try out new equipment and techniques, and adapt them to the communication of information. Our principal interest is in communicating the results of scientific research--interpreted as broadly as possible. What I'm about to talk about is one contribution--largely a mechanical one--to making television more useful. We have designed a system-- and now we are looking for uses for it.

The Columbus, Ohio, Laboratories of Battelle Memorial Institute form the heart of a large, independent, multi-national, research institute--the largest organization of its type in the world. Known originally for

4 work in metallurgy and physics, Battelle, in the years following World War II, has greatly expanded and broadened its interests in the social sciences. A little more than four years ago, a Communications Media Research Laboratory was set up under George Tressel, a physicist who made the transition from the hard to the soft sciences.

We are a small staff of various backgrounds--ranging from medical art, to journalism, to applied engineering. Together, we are seeking to provide useful innovations -- both in the development and in the application of audio-visual equipment. The first step was to develop and use a model facility for making technical films. We are deeply involved in that area, having received several awards for film production. But I must hasten to add, we are not film producers in the commercial sense. Our ideas are the useful product. For example, we can provide the technical expertise needed in a consideration of environmental or social problems. Subject matter experts are at our fingertips. Last year we produced a series of films on environmental problems for commercial television. An important project, recently completed, has been the design and construction of a unique, computer-controlled animation facility. Our biggest current project is to prepare an hour-long documentary on the "state of science" for network television.

In communications technology, we've found in many cases that what we wanted simply wasn't available on the market. So we had to build our own--or to adapt commercial hardware. For example, in most multi-media presentations the media must run the show through an automatic sequencing and timing arrangement. Our approach is to let the lecturer or his assistant control the timing through a simple push button. Our equipment controls only the sequence of slide, film, and videotape portions. It sounds straight forward enough, but we have to build our own sequencer just to accomplish this.

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We became involved in closed-circuit television about two years ago. Our experience led to an interest in cable television, and we're now developing a concept for cable TV in the Inner City. Another spinoff has been our conviction that the camerman can and should be removed from the camera in a closed-circuit system.

Remote-control television once was viewed as a labor-saving device. It was reasoned that doing away with the cameraman might cut the costs of commercial television. For some reason, this did not catch on, possibly because the early systems malfunctioned, but more probably because people realized that somebody has to control the camera, no matter where it's situated.

But there is another advantage to remote control, an important one, particularly when you do not want a sideshow. You do not want the medium to influence what is going on. Alan Funt recognized this in his "Candid Camera" programs which were so successful on network television a few years ago. (Though of course his programs were filmed with a concealed camera rather than a remote-control one).

In more technical terms, the principle is this: <u>The Process of observation must not be allowed to influence the research results</u>. This is a very difficult principle to practice, whether one is looking at fundamental high-energy particles or at a group of college sophomores in a contrived psychology experiment.

A lot has been done in recent years to make television less obtrusive. But we still rely on the conventional camera-cameraman crew. Even the Video-Rover (the "porta-pack") is at least as conspicuous as a conventional 16 mm film camera. Yet, using presently available technology, there <u>should</u> be ways of making television no more obtrusive than a pencil and paper.

6 Before I describe our approach to this problem, I should add a few qualifying remarks. Most commercial television is in color, and it's only natural that we're beginning to think of color for closed-circuit videotape. Many of the small video recorders now have color capabilities, and some of us have seen the spectacular demonstrations of color videotape now available for the Sony and Norelco video cassette recorders. But making color videotape is another problem. We feel that the cameras and video control equipment for color are still too big, expensive, and unreliable. Nearly ten times as expensive as comparable black and white equipment, and you'd better have a qualified color technician to operate the system. We feel that slides and film are still the media of choice if color is an important requirement.

It is the small, inexpensive black-and-white camera that has put television in the hands of the "personal" communicator. One such camera, now being developed by RCA, is about the size of a pocket transistor radio. Other small cameras, which you can buy for a few hundred dollars, produce adequate pictures at practically any light level. Fairly inexpensive remotely-controlled zoom lenses are available and work quite well, though some improvements could be made.

To remove the cameraman from the camera, then essentially all that we needed was a remote-controlled pan and tilt mechanism. Bill Westbrook and Bob LaBounty, of our staff, first looked at commercial motorized pan-tilt devices, but they proved too big and too awkward, like using a Navy gun mount to hold a rifle. The next step was to design and build our own servo system, using small d.c. motors and some circuitry for variable speed control. By last fall, two of the remote pan-tilt mechanisms had been built and tested, and the other elements of a remote-controlled system had been put together.

7 The basic system includes three remotely-operated cameras, two with the remote pan-tilt mechanisms and remotely operated zoom lenses and one with a permanently mounted wide angle lens. All control functions for these cameras are handled in a temporary control room -- which can be any small room as far away as several hundred feet from the cameras. A fourth camera in the control room is used to pick up title cards and special visuals.

We began by using the basic Sony equipment that now is used quite widely. This equipment is small, quite rugged, and fairly inexpensive. To get better picture quality, we now are going to somewhat larger (Dage) cameras and are standardizing on one-inch videotape for master recordings. Two recorders are operated in tandem. Three people in the temporary control room operate all of the controls for the cameras and recorders.

Providing a better way of covering a technical meeting was the primary objective in developing the remote-control television system, but we're already using it in a variety of ways--from showing a research sponsor the progress of work on his project to developing a "telecourse" on information science for librarians. We have proposed an "impact" analysis of the television series "All in the Family", using remote-control video to watch people while they are watching Archie Bunker.

The first large-scale demonstration of our system came last November at the annual "New Horizons in Science" briefing sponsored by the Council for the advancement of Science Writing. This briefing gave science journalists an opportunity to hear about what's new in research from a hand-picked collection of the nation's top scientists. We came to the briefing with the understanding that television would in no way interfere with what was going on. It was agreed that the videotaping would stop if anyone objected.

8 (As it was, few of those at the meeting even noticed us until our presence was announced on the second day.) We taped all 18 principal speeches. One of them--a banquet speech--was even taped by candlelight. Though this was planned mainly as an experimental demonstration, five major laboratories have shown selections of the tapes to their scientists.

In a minute, we'll show a short sampling from the seminar tapes. But first, let me describe how our system will be used later this year in another professional society meeting.

The meeting will be held in a large metropolitan hotel--like the Sheraton-Biltmore. Several of the speakers will come to the hotel the day before the meeting to videotape extracts of their papers. The extracts then will be shown throughout the meeting on television sets in a special "video-lounge". Printed copies of the papers will be available in the lounge. Then, during the time normally allotted for the papers, there only will be questions and answers.

The entire meeting will be videotaped, by remote control, for showing in local chapters. Tapes will be edited on the spot and circulated as prepackaged chapter programs. In addition, during the meeting, sessions will be rerun by videotape so that no delegate will have to choose between concurrent section sessions. In addition, there will be a convention "highlight" newsreel--edited from the tapes--presented daily over the hotel's own closed-circuit television system. And finally, excerpts of the convention will be transmitted via satellite to similar professional societies in Europe.

Such ambitious use of videotape to cover a convention may at first seem extravagent. Not so, however, if you compare the costs of video

9 publication with conventional publication costs. And the big advantage, of course, is that what is said at the convention is available right now, rather than at some later time. All that is necessary in print is an index to the tapes.

Walter Froelich, the science editor of the United States Information Agency, caught some of our enthusiasm when we demonstrated the remote-control video recording system last November. This is what he said:

"At the podium, a scientist is talking about and demonstrating his work and his plans and hopes. Watching and listening are about 100 writers who specialize in reporting and interpreting science events. From all appearances, a very conventional conference is underway.

"What is unusual is that this conference is serving as a test subject for an experiment in scientific communication that could have global implications. Almost unnoticed by the men and women in the auditorium, four television cameras observe the scene. Microphones pick up every spoken word.

"The purpose of the experiment is to find a short-cut in the long and sometimes arduous routes scientific discoveries most often travel before they can find their way from the research laboratory to use for the benefit of the public.

"The annual science writers briefings have come to be regarded as key tools in U.S. science communication. But if the Battelle concept bears fruit, the video recording experiment could turn out to be far more significant than anything else at this ninth annual briefing."

We have a sample tape which demonstrates some of the aspects of remote-control video recording. It represents the state of development of our system as of last November. With the larger cameras and new ten-inch zoom lenses, we now are approaching a level of quality that is comparable with that of commercial television--but still with a remote-control system that can be carried in the back of an ordinary station wagon.